

indirectly dependent on the dynamical changes taking place at the sun's surface.

iii. The distance between the instantaneous and mean poles decreases with increasing intensity of earth-magnetic disturbance.

iv. The length of the period of latitude-variation increases with increasing intensity of earth-magnetic disturbance.

v. In strict analogy with the phenomena of auroræ and of magnetic disturbance, the influence of the eleven-years period of sun-spots, as well as of the "great" period, is clearly exhibited in the phenomenon of latitude-variation; and the same deviations from the solar curve as are manifested by the auroræ are also evident in the motion of the pole.

vi. The half-yearly period of the earth-magnetic phenomena influences the motion of the pole of rotation in such a way that its path, instead of being circular, assumes the form of an ellipse, having the mean pole at its centre.

vii. The half-yearly period also explains the conspicuous fact of a rotation of the axes of the ellipse in a direction opposite to that of the motion of the pole.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

PROF. J. G. MACGREGOR, of Dalhousie University, Halifax, Nova Scotia, has been appointed professor of physics in University College, Liverpool, in succession to Prof. Lodge.

THE Calendar of the Glasgow and West of Scotland Technical College, for the session 1900-1901, has been received. Among the contents of the volume we are glad to notice schemes of courses of study, extending over three years, for students who intend to take up some branch of applied science or engineering as a profession. Students are permitted to attend single classes, but they are encouraged to follow one of the regular courses in the several departments of study. This is the only way to derive any real advantage from a Technical College, desultory attendance at classes without any definite object being of little value.

AT a special meeting of the University Court of St. Andrews, held on Saturday last, the proposal of the Marquis of Bute, who offered a sum of 20,000*l.* to be held as a fund for endowing a chair of anatomy in the University, was considered. After deliberation, the Court resolved cordially to accept the proposed gift on the conditions as stipulated by his lordship, and to request the Lord Rector to inform Lord Bute of the Court's decision. The Court further resolved to proceed at once with the creation of a professorship of anatomy at St. Andrews, to be endowed by Lord Bute's gift, the first presentation to the chair being Dr. Musgrove, the present lecturer in anatomy, such presentation to be made as soon as the ordinance creating the chair is approved by her Majesty in Council.

THE mission of science in education was recently considered in some detail by Prof. J. M. Coulter in an address delivered at the University of Michigan, and published in *Science*. The claims set forth in the paper are formulated as follows:—The introduction of science among the subjects used in education has revolutionised the methods of teaching, and all subjects have felt the impulse of a new life; it has developed the scientific spirit, which prompts to investigation, which demands that belief shall rest upon a foundation of adequate demonstration, which recognises that the sphere of influence surrounding facts may be speedily traversed and that everything beyond is as uncertain as if there were no facts; it has introduced a training peculiar to itself, in that it teaches the attitude of self-elimination, an attitude necessary in order to reach ultimate truth, and thus supplements and steadies the other half of life, which is to appreciate. To obtain these results, there must be teachers who can teach, whose background and source of supply is the investigator. Moreover, the results are immensely desirable, inasmuch as they do not interfere with anything that is fine and uplifting in the old education, but simply mean that the possibilities of high attainment and high usefulness are open to a far greater number.

MESSRS. S. Z. DE FERRANTI, the electrical engineers at Hollinwood, near Oldham, have just adopted an educational scheme for their apprentices. Success at evening classes, combined with steady work, are to be the chief recommendations for promotion from one department to another. And the apprentice who obtains the highest position in the South Kensington Examinations in subjects of importance to the theoretical training of an engineer will be awarded a scholarship tenable in the day engineering department of the Manchester Municipal Technical School. His fees will be paid by Messrs. Ferranti, and also the wages he would receive if working in their shops. Mr. F. Brocklehurst takes this generous scheme as the text of a pamphlet upon "Technical Education," issued by the Technical Instruction Committee of Manchester, and he hangs upon it some instructive remarks as to the responsibilities of manufacturers and the nation at large, if England is to maintain her position in the industrial world. Referring to education in Switzerland, he points out that at Winterthur, a small engineering town near Zurich, the technical school is attended by 400 day students who have voluntarily left their employment (sacrificing their wages in so doing) for one or two sessions in order to devote themselves to technical study. The town, the canton and the State combine to assist the realisation of their ambitions by bearing the burden of cost, and in keeping the fees of the technical school low. In the same way the great Polytechnic of Zurich is crowded in its day department with hundreds of young men preparing themselves for the engineering, electrical and chemical industries. Germany provides many similar examples. In the Technical High School of Darmstadt there are to be found 1100 day students, all of them over eighteen years of age, many of them graduates of universities, and the remainder having received a splendid high-class education in secondary schools. These are engaged in the study of electrical, chemical or mechanical science directly bearing upon industrial pursuits. This is only one of many technical high schools in Germany, the culmination of which is seen in the Charlottenberg Technical High School, near Berlin—the finest institution of its kind in the world—with its more than 2000 day students. These young men are being prepared for the highest positions, as technical chemists, mechanical, naval, civil and railway engineers, ship-builders and architects. There are now in the German Technical High Schools no fewer than 11,000 day students. In connection with the figures given it must be noted that (1) they are exclusive of science students taking university courses; (2) the pupils are without exception youths of over eighteen years of age; and (3) each technical high school insists upon an entrance examination of an exacting character.

The great advance of the United States in engineering is, as Mr. Brocklehurst remarks in his pamphlet referred to above, largely due to the fact that during the last forty years very important engineering schools have been founded. The chief of these is the Massachusetts Institute of Technology at Boston. This is attended by 1171 day students, whose average age at entrance is eighteen years and nine months, and who are either graduates from other colleges or have attended the public high schools for at least four years. The Worcester Engineering Polytechnic has 823 day students. Nearly 1000 are in the Lehigh Engineering College. The Stevens Institute of Technology, New Jersey, has 214; and the Case School of Applied Science in Cleveland, Ohio, 218. Five hundred and ninety-seven day students attend the classes of the Sheffield Scientific School in Connecticut, while the Sibley College of Engineering—part of Cornell University, New York—has 492 day students. There are 242 day students in the Engineering Department of the University of Michigan. A recent report shows that in the Engineering Colleges of the United States the number of day students enrolled is 9659, and that their growth since 1878 is 516 per cent. Fifty-one per cent. of these students have had a three-year high school course, which would bring them to seventeen years of age. The number of engineering students graduated in 1899 was 1413, and the number of institutions providing an education in this branch of technical instruction (engineering) is 89. This is exclusive of evening work altogether. It is also exclusive of what America is doing in the fields of chemistry and textiles. Little wonder is it that this wealth of educational opportunity is producing its crop of skilled craftsmen trained to compete on more than equal terms with the Briton. The Manchester Technical Institution Committee is doing a service to the nation by placing these facts prominently before the manufacturers of the district.